

REMARKS

By the present Amendment, claims 1-15 are cancelled and claims 16-34 are added. This leaves claims 16-34 pending in the application, with claims 16 and 29 being independent.

Restriction Requirement

Reconsideration and withdrawal of the restriction requirement is requested since the two groups of the newly submitted and pending claims satisfy the unity of invention requirements of this U.S. national phase of an International application, as indicated in the previously filed Written Opinion of the International Searching Authority and for the reason stated below. Additionally, the claims are related by being directed to a product and a method of making that product. No clear showing is presented that the product of claim 16 is not novel in view of the cited U.S. Patent No. 5,585,026 to Smith or any other cited patent document, as required by M.P.E.P. §1850.

Substitute Specification

The specification is revised to avoid the objections raised in the Office Action and to eliminate grammatical and idiomatic errors in the originally presented specification. The number and nature of the changes made in the specification would render it difficult to consider the case and to arrange the papers for printing or copying. Thus, the substitute specification will facilitate processing of the application. The substitute specification includes no “new matter”. Pursuant to M.P.E.P. § 608.01(q), voluntarily filed, substitute specifications under these circumstances should normally be accepted. A marked-up copy of the original specification is appended hereto.

Rejection Under 35 U.S.C. §112, First Paragraph

Claim 12 stands rejected under 35 U.S.C. §112, first paragraph, as allegedly being based on an inadequate description. Specifically, the meaning of the phrase “an energy storage device, ... in thick or thin film technology” is questioned. Such recitation refers to a battery formed by such technology (i.e., printing corresponding electrochemical active layers on the flat carrier), as would be readily recognized by one of ordinary skill in the pertinent art from the disclosure of the originally filed application, particularly page 3, lines 18-20.

Thus, this feature, now recited in claims 27-28, is adequately disclosed to enable one skilled in the pertinent art to make and use the claimed invention. Reconsideration and withdrawal of this rejection is requested.

Rejections Under 35 U.S.C. § 112, Second Paragraph

Original claims 1-12 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. By the present Amendment, the originally filed claims have been rewritten to avoid the language alleged to be indefinite in the Office Action. All language of the presently pending claims is now believed to be clear and definite.

Thus, the pending claims are definite and comply with 35 U.S.C. § 112.

Rejection Under 35 U.S.C. §102 and §103

New claim 16 covers an adhesive fastener component comprising a flat carrier having opposite first and second surfaces, and a plurality of fastener elements protruding from at least the first surface of the flat carrier. The fastener elements are hooks, mushroom heads or loops. A printed heater is directly on at least certain sections of the flat carrier in thick or thin film technology, and converts supplied energy into heat.

By forming the adhesive fastener in this manner, a simple and cost-effective fastener component is provided with a heater. The fastener elements allow it to be readily attached to other structures.

Original claims 1-5, 7, 8 and 12 stand rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent Publication No. US2003/0042249 to Chen. The Chen publication is cited as disclosing a fastener component having a flat carrier 10 with fastener elements 141 and an electrical heating element 11 with a power source 12. Claims 3-5 and 8 are alleged to involve process limitations that do not distinguish the products. The parts of the Chen sleeve are alleged to be integral.

Original claims 8-12 stand rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent No. 4,696,066 to Ball. The Ball patent is cited for a fastener component having a flat carrier layer 28, 29 with fastening elements on one surface and a heating element 22 on one surface. The limitations of claims 3-5 and 8 are alleged to be process limitations that do not structurally distinguish the product. The parts of the Ball product are alleged to be integral. Relative to claim 11, the layers 27-30 allegedly can be textile material, with the heater 22 located between pairs of layers.

Original claims 6 and 9 stand rejected under 35 U.S.C. §103 as being unpatentable over the Chen publication. In support of the rejection, it is alleged that it would be obvious to add additional layers to increase strength. The use of hook/loop fasteners from polymer plastics is alleged to be well known with official notice thereof being taken.

Original claim 9 stands rejected under 35 U.S.C. §103 as being unpatentable over the Ball patent. Official notice is taken regarding the obviousness of making hook/loop fasteners from polymer plastics.

Original claims 1-12 also stand rejected as being unpatentable over the claims of copending U.S. Patent Application No. 10/541,827.

The Chen patent publication discloses a heating sleeve having a heating emitting member 11 affixed to the inner side of an open circular band 10. The band also includes self-adhesive patches 141 and 142 on its inner and outer surfaces adjacent its ends for closing band 10. The affixing of the Chen heating emitting band 11 to the inner side of open circular band 10 does not involve a printed heater in thin or thick film technology, as claimed.

The affixing of the Chen heating emitting member to circular band 10 involves the separate formation of two elements, i.e., member 10 and band 10, that are fixed, for example, by an adhesive layer or glue. In contrast, the present claimed invention requires a printed heater directly on the flat carrier with the fastener elements. The Chen sleeve uses a band 10 to separate its heating emitting member 11 from the flat carrier of the self-adhesive patches 141 and 142 in contrast to the claimed invention.

Thus, claim 16 is not anticipated or rendered obvious by the Chen publication.

The Ball patent discloses a heated coat liner having a panel 12 with a strip 17 of fabric hooks and a heating element in the form of a resistance wire sewn to a layer 28 of fire retardant material by heat resistant thread 23. In this manner, the flat carrier of the strip is spaced from the heating wire 22. Additionally, the heating wire 22 is not a printed heater directly on the flat carrier of the strip or on the layer 28 in thick or thin film technology, as claimed.

Accordingly, claim 16 is not anticipated or rendered obvious by the Ball patent. None of the other cited patents cure these deficiencies in the Chen publication or the Ball patent.

The claims of copending Application No. 10/541,827 do not recite or render obvious a heater. Thus, no double patenting exists.

Claims 17-28 and 31-34, being dependent upon claim 16, are also allowable for the above reasons. Moreover, these dependent claims recite additional features further distinguishing them over the cited patents.

Particularly, the dependent claims are further distinguishable by the heater converting electrical energy into heat of claim 17, the resistance heater of claim 18, the screen printed or offset printed heater of claim 19, the printed conductors and terminal electrodes of claim 20, the lamination of claim 21, the integral connection of the fasteners and flat carrier of claim 22, the thermoplastic shaping of claim 23, the materials of claim 24, the materials of claim 25, the two textile plies of claim 26, the energy storage of claims 27 and 28, the insulating layer of claim 31, the heater location of claim 32, the electrically conductive portions of the flat carrier and fastener elements of claim 33, and the interruption, cover and cover layer of claim 34, particularly within the overall claimed combination. The limitations of claims 16, 19, 20 and 23 are structural limitations, not process limitations, and thus, must be given weight. In re Garnero, 162 USPQ 221, 223 (C.C.P.A. 1969) stating that terms such as “interbonded”, “ground in place”, “press fitted”, “etched” and “welded” are structural limitations. The use of “official notice” is challenged, such that evidence to support the allegation of obviousness relative to claim 24 must now be provided. M.P.E.P. §2144.03.

Claim 29 recites a method for producing an adhesive fastener component comprising the steps of forming a flat carrier with opposite first and second surfaces and a plurality of fastener elements protruding from the first surface of the flat carrier and being hooks, mushroom heads or loops, and then subsequently applying a heater directly onto the flat carrier at least in certain sections of the flat carrier for converting supplied energy into heat where the application is accomplished by printing in thick and thin film technology.

As noted above, the thick or thin film technology is not disclosed or rendered obvious by the cited Chen publication or the cited Ball patent.

Claim 30 being dependent upon claim 29, is also allowable for the above reasons. Moreover, this dependent claim is further distinguishable by the surface treatment performed before application of the heater.

In view of the foregoing, claims 16-34 are allowable. Prompt and favorable action is solicited.

Respectfully submitted,



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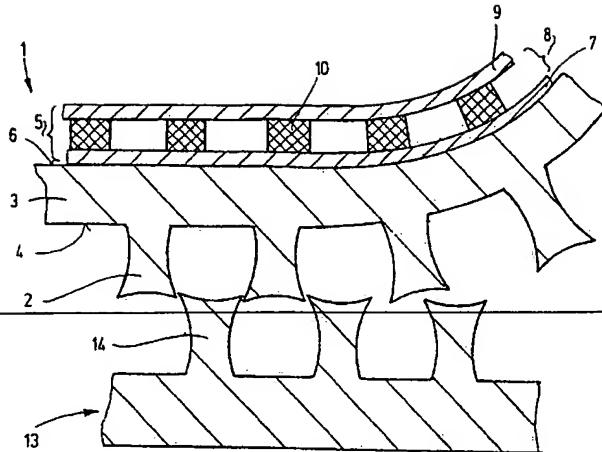
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for

CLOSING MECHANISM COMPRISING A HEATING MEANS, AND
METHOD FOR PRODUCING ONE SUCH CLOSING MECHANISM



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(57) Abstract: The invention relates to a closing mechanism (1; 101; 201; 301) comprising a plurality of closing elements (2; 102; 202; 302, 302a) such as hooks, mushroom heads or loops. Said closing mechanism (1; 101; 201; 301) comprises a flat carrier (3; 103; 203; 303) and the closing elements (2; 102; 202; 302, 302a) protrude from at least one surface (4) of the carrier (3; 103; 203; 303). The inventive closing mechanism (1; 101; 201; 301) is characterised in that it comprises a heating means (5; 105; 205; 305), at least in certain sections, which converts supplied energy into heat. The invention also relates to an associated production method.

{Fortsetzung auf der nächsten Seite}

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~~Closing Mechanism Comprising a Heating Means, and Method for Producing One Such Closing Mechanism~~

— The present invention relates to a closing mechanism comprising a heating means, and a method for producing one such closing mechanism.

Background of the Invention

Generic adhesive fastener components are known disclosed, for example from, in DE 196 46 318 A1. An adhesive fastener generally formed from two adhesive fastener components which that can be dynamically joined to each other is often used in textile or other articles of clothing, and is also known as a Velcro® fastener. Other applications are, for example, mounting technology, for example, for fastening of elements of interior trim in automotive engineering, or generally the production of a detachable fastening.

The Summary of the Invention

An object of the present invention is to increase the functionality of provide improved adhesive fastener components and adhesive fasteners and to make available the pertinent with increased functionality, and to provide an improved production process for such an adhesive fastener component.

This object is basically achieved by the adhesive fastener component defined in claim 1 and by the production process defined in the subordinate claims. Special versions of the invention are defined in the dependent claims.

In an adhesive fastener component with a plurality of adhesive fastener elements such as, for example, hooks, mushroom heads, or loops, the. The adhesive fastener component having has a flat carrier and the. The adhesive fastener elements protruding protrude from at least one surface of the carrier, the object is achieved in that the. The adhesive fastener component, at least in certain sections, has a printed heating means which that converts supplied energy into heat.

By preference Preferably, the heating means is applied to the carrier as flat resistance heating, and in. In addition to the actual resistance layer also, electrode layers, cover layers, reflection layers for heat radiation, protective layers, etc., can be applied. The heating layer can be applied masked or unmasked, especially masked in the form of a resistance path, preferably a meander-shaped resistance path. Several resistance and/or connection paths which are electrically insulated against relative to each other, and can also be applied on top of each other and/or next to each other.

The adhesive fastener component can preferably be easily deformed elastically or plastically, and can be drawn into almost any shape. Preferably, the adhesive fastener component can also be deep-drawn, while retaining its adhesion capacity and heating capacity. Basically the heating means can be located on the carrier and/or in the carrier. Preferably, the heating means can be applied in thick or thin film technology to the flat carrier of the adhesive fastener component or. Alternatively, the heating means is applied to another carrier which is connected to the flat carrier of the adhesive fastener component, especially is laminated onto it.

The combination of adhesive fastener elements and heating means as claimed in the present invention is advantageous also, because the thermal expansion of the resistance path and/or of the other layers of the heating means and/or of the carrier which occurs occurring in operation of the heating means can be accommodated by the adhesive fastener elements without the attachment of the adhesive fastener component being adversely affected or without, for example, flapping noise occurring due to loosening of an attachment. Moreover, it is advantageous that the adhesive fastener elements enable a flat connection of the heating means, and thus also especially good heat

transfer to the heat consumer. The heating means with the carrier forms a unit so that a separate connection between the heating means and the adhesive fastener elements can be omitted.

Fundamentally all processes known from thick and thin film technology are possible for application of the heating means to the carrier of the adhesive fastener component. In one special embodiment of the present invention, the heating means is applied to the flat carrier by screen printing or offset printing. With application of the heating means, printed conductors, terminal electrodes or other electrical and/or electronic components can also be produced at the same time.

To the extent the material of the flat carrier of the adhesive fastener component enables it, for example consists, is formed of a polymer plastic which that is semiconductive at least in certain sections, or of the corresponding textile materials, active electronic components, such as, for example, field effect transistors, can also be monolithically integrated into the adhesive fastener component. It is also possible to integrate hybrid circuit electronics, for example, to fix control circuits on especially thin and therefore flexible silicon substrates of less than 50 µm thickness, preferably less than 20 µm, on or in the carrier or to incorporate them into a textile carrier. Thus, for example, a temperature measurement element, a thermostat element and/or a switching device can also be integrated, as is often necessary for operation of a heating means.

Power can be supplied by an external energy storage device, or. Alternatively, the adhesive fastener component can have an energy storage device, especially an electrochemical energy storage device in thin or thick film technology.

Preferably the carrier and/or the adhesive fastener elements are made from a polymer plastic, especially from polyester or polyamide, for. For less stringent requirements for thermal stability also from polyolefins, such as, for example, polypropylene or polyethylene, or from a biodegradable material or other suitable plastic, can be used. For many applications, it is advantageous if the plastic is a duroplastic, for example, an acrylate plastic, and in this case the crosslinking. Crosslinking can be controlled by some amount of energy applied, especially by irradiation and/or by supplying heat. Alternatively to a duroplastic, the plastic can also be

thermoplastically moldable, and a method according to DE 196 46 318 A1 can be used to produce the adhesive fastener elements. Preferably, the adhesive fastener elements are made integral with the carrier. The adhesive fastener elements can also be produced as described in DE 101 06 705 C1, especially with an application device by which the adhesive fastener elements are built up in successively delivered droplets.

In one embodiment of the present invention, heating systems in almost any geometry can also be easily mounted at poorly accessible locations, with a high level of freedom of shapes, but in a space-saving manner and, if necessary also, detachably. For example, in this way, seat, mirror, interior or defrosting heating systems or the like which that are simple to install can be implemented in motor vehicles, living spaces, or facilities in the open.

Moreover, as claimed in the according to the present invention, heating systems can be implemented for example for mechanical, pneumatic, hydraulic, electrical and electronic assemblies with which the. The heat energy can be supplied exactly to the required locations in a pin-point manner and with almost any freedom of shape. For this purpose, the heating means adapted to the application can also produce heat superficially in a non-uniform manner, for example, by local variation of the resistance as a result of changes in the composition, thickness, or lateral geometry of the resistance layer.

The devices as claimed in the of the present invention are thin, have a low weight, can be controlled in their heat output and/or heat -distribution, and offer explosion-proof heating. Based on a combination with an adhesive fastener component, complex two- and three-dimensional geometries can be permanently and reliably supplied uniformly or with a definable heat distribution. The service life potential is long compared to known heating means, especially compared to heating means which have having a heating wire. Terminal and connection contacts, like trigger electronics, can be integrated into the adhesive fastener component. For example, a receiver can be integrated into the adhesive fastener component, by which a control signal can be received and thereupon the heating means is turned on and off.

By preference Preferably, the heating means is located on the surface of the adhesive fastener component opposite the adhesive fastener elements. As an alternative, adhesive fastener elements can also protrude from the two surfaces of the carrier. There can also be a A partial surface which is can be free of adhesive fastener elements on the surface which, otherwise has having adhesive fastener elements, for application of the heating means. In this way, the heating means and/or its electrical contact is protected by the carrier in any case after attachment of the adhesive fastener component.

The carrier of the adhesive fastener component can also be a textile product, especially a product which has been produced by weaving, knitting, braiding, or embroidery. In this case, for example, individual threads or thread groups, especially warp and/or weft threads, of different plies of the textile product can be made as connecting leads, for example by their being. Such connecting leads can be formed by conductive filaments or having a conductive coating. Preferably, the heating means is located between two plies of the textile carrier.

TheThe present invention also relates to a method for producing an adhesive fastener component with a heating means, as described above, by the. The heating means being is applied to the carrier which already hashaving adhesive fastener elements. In one special embodiment of the present invention, the heating means is applied, especially printed, in thick or thin film technology, onto the flat carrier. This method is especially advantageous when the adhesive fastener elements and the flat carrier are made in one piece by thermoplastic shaping.

An electrical contact geometry of the heating means is also possible by specifically influencing the electrical conductivity of individual or groups of adhesive fastener elements configured in a grid in regular structures. The adhesion of the heating means to be applied, that is, the adhesion of the heating means to the carrier of the adhesive fastener component, can be improved by surface treatment, especially by a gas atmosphere whichthat increases the polarity of the carrier molecules near the surface. As an alternative or in addition, a adhesion-imparting coating, for example, a polymer which differsdiffering from the carrier, can be applied to the carrier, especially when it consistsformed of polyamide.

Further Other objects, advantages, and salient features, and details of the present invention will be become apparent from the dependent claims and the following detailed description, in which, taken in conjunction with reference to the drawings several exemplary the annexed drawings, discloses preferred embodiments are described in particular. In this connection of the features mentioned in the claims and in the description are essential for the present invention individually or in any combination.

Brief Description of the Drawings

Referring to the drawings which form a part of this disclosure:

FIG. 1 shows is a crosspartial side elevational view in section through of an adhesive fastener with an adhesive fastener component as claimed in the according to a first exemplary embodiment of the present invention,

FIG. 2 shows is a perspective view in section of the adhesive fastener component similarly to the one in FIG. 1, with the resistance path printed on the adhesive fastener component;

FIG. 3 shows 3 is a partial side elevational view in section of an adhesive fastener according to a second exemplary embodiment of the present invention; ;

FIG. 4 shows 4 is a partial side elevational view in section of an adhesive fastener according to a third exemplary embodiment of the present invention; ;

FIG. 5 shows a is a partial side elevational view in section of an adhesive fastener according to a fourth exemplary embodiment of the present invention; ; and

FIG. 6 shows is a partial side elevational view in section illustrating one application of the an adhesive fastener component as claimed in the according to the present invention.

Detailed Description of the Invention

FIG. 1 shows a cross section through an adhesive fastener with an adhesive fastener component 1 as claimed in accordance to a first exemplary embodiment of the present invention. It has a plurality of adhesive fastener elements 2 which are configured regularly in rows and columns and which are formed integrally with a flat carrier 3 of thermoplastically moldable plastic, and protrude obliquely and. The fastener elements protrude angularly, preferably at a right angle, from a first surface 4 of the carrier 3.

On the second surface 6, opposite the first surface 4, there is a heating means or heater 5 is provided on the carrier 3. The heating means 5 is applied in thick film technology, especially by screen printing, to the carrier which already has having the adhesive fastener elements 2 and which has been completed in this respect, and in addition to thereon. The heating means includes an insulation layer 7 and, a cover layer 9, has and a structured heating layer 8 which is located in between and which is layers 7 and 8 and formed essentially by elongated resistance paths 10.

A material for the resistance path 10 can be, for example, resistance materials known from thick film technology, with which sheet. Sheet resistances can be implemented in a wide range, for example, between 2 and 1000 ohms per square. Resistance materials can also be used which have having an electrical resistance which is largely independent of temperature. Alternatively, resistance materials with a definably positive or negative temperature coefficient of the resistivity can be used which to implement a thermostat function during operation with a constant voltage or with a constant current.

Typical layer thicknesses are between 10 and 100 µm, especially between 20 and 50 µm. The heat outputs per unit of area depending on the application can be, for example, between 1 and 2000 watts per m², for individual or interior heating systems in motor vehicles especially between 100 and 300 watts per m². Heating optimized for the application can be implemented by the configuration and design of the resistance path 10 with respect to layer thickness, path width and resistance material. Connecting leads which that may be necessary can be produced with sheet

resistances below 1 ohm per square, especially less than 0.25 ohm per square, for example, also by silver enamels, copper enamels, carbon enamels and the like.

The layer thickness ratios both of the carrier 3 including the adhesive fastener elements 2 and also of the heating means 5 are not shown to scale in the figures, especially. Especially for purposes of depiction, individual layers are shown enlarged. Moreover the heating means 5 can also have more than three layers, especially other layers for protection, for blocking moisture or for electrical insulation. The adhesive fastener component 1 as claimed in the of the present invention can be joined, as shown in FIG. 1, to another adhesive fastener component 13 which is set up almost identically with respect to the carrier 3, in. In particular, the adhesive fastener elements 2, 14 can be detachably engaged to one another, or can also be joined to a textile adhesive fastener element or an article of textile clothing.

FIG. 2 shows a perspective view of the adhesive fastener component 1 similarly to the one from FIG. 1, only but with the resistance path 10 which has been printed directly on the second surface 6 of the carrier 3 being shown. The resistance path 10 runs in a meander with variation both of the path width and also of the distance of adjacent path sections. Contact with the resistance path 10 can be made by way of terminal electrodes 15, 16, which are located next to each other on one common side of the adhesive fastener component 1.

FIG. 3 shows a second exemplary embodiment of the adhesive fastener component 101 as claimed in of the present invention. In this exemplary embodiment, the adhesive fastener elements 102 are located on the same surface as the heating means 105. The area of the carrier 103 in which the heating means 105 is located is however free of adhesive fastener elements 102. On the same surface, the connecting lead 115 for the resistance path 110 which has been printed in the insulation layer 107 is routed to the terminal protrusion 118.

Another or a second adhesive fastener component 113 on its surface facing the adhesive fastener component 101 as claimed in the of the present invention likewise has adhesive fastener elements 114 and a terminal protrusion 119 which is connected to the connecting lead 120. The

adhesive fastener elements 102, 114 of the two adhesive fastener components 101, 113 are engaged to one another by pressing on them ~~and at~~. At the same time, the two terminal protrusions 118, 119 come into electrical contact. In this way, reliable contact with the resistance path 110 can be made by ~~way of~~ the connecting lead 120.

FIG. 4 shows a third exemplary embodiment of an adhesive fastener component 201 as claimed in, according to the present invention. The carrier 203 which preferably consists of a thermoplastic, like also the adhesive fastener elements 202 located in this area 221, is made electrically conductive by the corresponding modification of the plastic, as is indicated by the criss-crosshatching, for example, by intercalation of conductive particles. In these areas 221, the carrier 203 makes contact with the heating means 205 which is located on the second surface 206 and which has ~~having~~ an insulation layer 207 which in the corresponding areas likewise has electrically conductive terminal electrodes 222 which. Electrodes 222 are electrically connected to the electrically conductive adhesive fastener elements 202. In this way, the adhesive fastener component 201 and especially the heating means 205 can make electrical contact with the back of the carrier 203 which is opposite the heating means 205, for example, by ~~way of~~ external contact pieces 223.

Executing the heating means as a resistance layer also makes it possible to implement a pushbutton element 211 by structuring the resistance path 210. For this purpose, for example there can be, an interruption of the resistance path 210, can be provided. With the interposition of an electrically insulating intermediate layer 225 there is an, a conductive contact bridge 210a is located over it, which under. Under the action of a force according to the arrow 212 contact bridge 10a electrically closes the interruption as the cover layer 209 is deformed. The elasticity of the heating means 205 and/or of the carrier 203 ensures resetting of the pushbutton element 211 which is executed as a "make contact" in the exemplary embodiment.

FIG. 5 shows a fourth exemplary embodiment of an adhesive fastener component 301 as claimed in of the present invention which on. On both sides of the heating means 305 has, one respective carrier 303, 303a with adhesive fastener elements 302, 302a on the surface facing away

from the heating means 305 is provided. Between the insulation layer 307 and the cover layer 309 there are, two resistance paths 310, 310a are electrically insulated from each other by an intermediate layer 325, the. The lengthwise extension of the two resistance paths 310, 310a running obliquelyextends angularly to each other, especially at a right angle. The two resistance paths 310, 310a can be connected to each other by way of through-plating or externally and this canto be electrically connected in series or parallel.

FIG. 6 shows one application of an adhesive fastener component 1 as claimed inof the present invention, simply for. For reasons of greater clarity, the separating line between the carrier 3 and the heating means 5 (see FIG. 1) is not being shown. The adhesive fastener component 1 is fixed by means of the adhesive fastener elements 2 on a support body 24, with a surface which is formed, for example, by a textile fleece material, or. Alternatively, on its surface, another adhesive fastener component 13 is fixed over the entire surface or in certain sections, for example, as a deep-drawn part. The adhesive fastener component 1, in spite of the projecting structure of the support body 24, ensures uniform heating on all sides. The adhesive fastener component 1 as claimed inof the present invention can be formed as a deep-drawn part, while maintaining the adhesion fastening capacity, and the heating capacity, so that in each instance even complexly shaped support bodies 24 fit precisely.

While various embodiments have been chosen to illustrate the invention, it will be understood by those skilled in the art that various changes and modifications can be made therein without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

CLOSING MECHANISM COMPRISING A HEATING MEANS, AND
METHOD FOR PRODUCING ONE SUCH CLOSING MECHANISM

Abstract of the Disclosure

A closing mechanism (1; 101; 201; 301) includes a plurality of closing elements (2; 102; 202; 302; 302a) such as hooks, mushroom heads or loops, and a flat carrier (3; 103; 203; 303). The closing elements (2; 102; 202; 302; 302a) protrude from at least one surface (4) of the carrier (3; 103; 203; 303). The closing mechanism (1; 101; 201; 301) has a heater (5; 105; 205; 305), at least in certain sections, which converts supplied energy into heat. The invention also relates to an associated production method.